



Research article

Role of dicot angiosperms in the livelihood of *Mishing* community in Sonitpur district, Assam, India

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Abstract: Assam, a state in Northeast India holds and supports a high percentage of tribal population, highly distinguished in terms of ethno-lingual physiognomies as well as livelihood status in their habitats. The *Mishing* people or *Mising*, also called *Miri*, is a major ethnic tribal community inhabiting in the Sonitpur district of Assam and the second largest tribal group in Northeast India. The livelihoods of Mishing community are closely associated with several plant species. The present study was carried out in the Sonitpur district of Assam, India to trace out the role of dicot angiosperm in the livelihood pattern of Mishing community living in the area. Through a series of extensive survey a total number of ethnobotanically important dicot plant species under 64 genera and 45 families were recorded. 48 dicot plant species were exclusively used for medicinal purposes and 25 dicot plant species were found to be marketed for different purposes as NTFPs. The uses and marketing of different Non Timber Forest Products (NTFPs) were also recorded to determine their economic reliance. While, 11 species of dicot angiosperm were recorded that are used for the preparation of *Rogjin Apong*, an ethnic alcoholic rice bear.

Keywords: Dicot Angiosperms - Mishing Community - Livelihood - Sonitpur - Assam.

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INTRODUCTION

India has about 10.05 crore tribal population, consisting 8.60% of country's total population (Census 2011). The tribal population in India contains approximately 250 groups, speaking about 105 languages and 225 subsidiary languages. In the context of socio-economic development, the tribals in India vary from primitive life style to modern way of living. The primitive tribal economy is intimately connected with forests and its resources. Tribal's and their symbiotic relationship with forest and their surrounding environment has been seen through nature worship since ancient times. Nature gives many things such as food, medicine, raw materials, shelter, fertilizer, fuel, timber etc. Thus tribal people are dependent on these natural resources for their livelihood and sustenance. Many workers reported that tribal peoples are highly dependent on NTFPs for the source of income and livelihood (Rao 1987, Gauraha 1992, Chopra 1993, Mallik 2000). About 60 per cent of NTFPs is consumed by about 7 crore tribals or ethnic communities in the country and reported to contribute about 10 to 40 % of their household earnings (Shiva 1993). About 70% of Indian population dwells in rural areas and many of them rely on various non-timber forests products for their sustenance (Datta *et al.* 2014). Medicinal plants have a long-standing history among indigenous communities and are an integral part for treating various diseases, particularly to curb/cure daily ailments and this practice of traditional medicine is based on experience of hundreds of years of belief and observations. Indigenous healing practices have been culturally accepted during all phases of human culture and environmental evolution. Traditional medicine is widely used since prehistoric period (Singh & Lahiri 2010) and accounts for about 40% of all health care delivered (WHO 2005). It has also been estimated that about 85% of worldwide traditional medicines are derived from plants (Fransworth 1988). Majority of different tribal community of Indian population depend directly or indirectly on about 7500 different medicinal plants for the treatments of their various health ailments.

India is one of the great treasures of ethnobotanical wealth having ultimate multiplicity of ethnic community and highly engrossed biological (Kala 2005) resources. In developing countries, the use of herbal treatment is enormously increasing day by day and many modern researchers are trying to intricate and explore the huge potential of ethnobotanical knowledge of medicinal plants for treatment of various diseases (Kala 2005, Dutta & Dutta 2005, Jain *et al.* 2010, Jeyaprakash *et al.* 2011, Mehra *et al.* 2014, Bajpai *et al.* 2016, Ngbolua *et al.* 2016). However, the ethnomedicinal plants in their natural habitat are under threat due to deforestation, overgrazing and their reckless harvesting and utilization. Several workers carried out, ethnobotanical studies with reference to the uses of medicinal plants by different tribal communities from various places of Assam (Jain & Borthakur 1980, Jain 1987, Jain 1989, Das 2008, Saikia *et al.* 2010, Rout 2012, Teron & Borthakur 2014). Among other tribes Mishing is a major tribal community of Sonitpur district whose livelihood is highly associated with the plants for medicine, food and for daily basic needs. The main source of livelihood for the Mishing community is agriculture. An attempt has been made to examine the dependency of Mishing community on several plants for medicinal uses values and NTFPs for marketing as one of their livelihood options in Sonitpur district of Assam, India.

MATERIALS AND METHODS

Study area

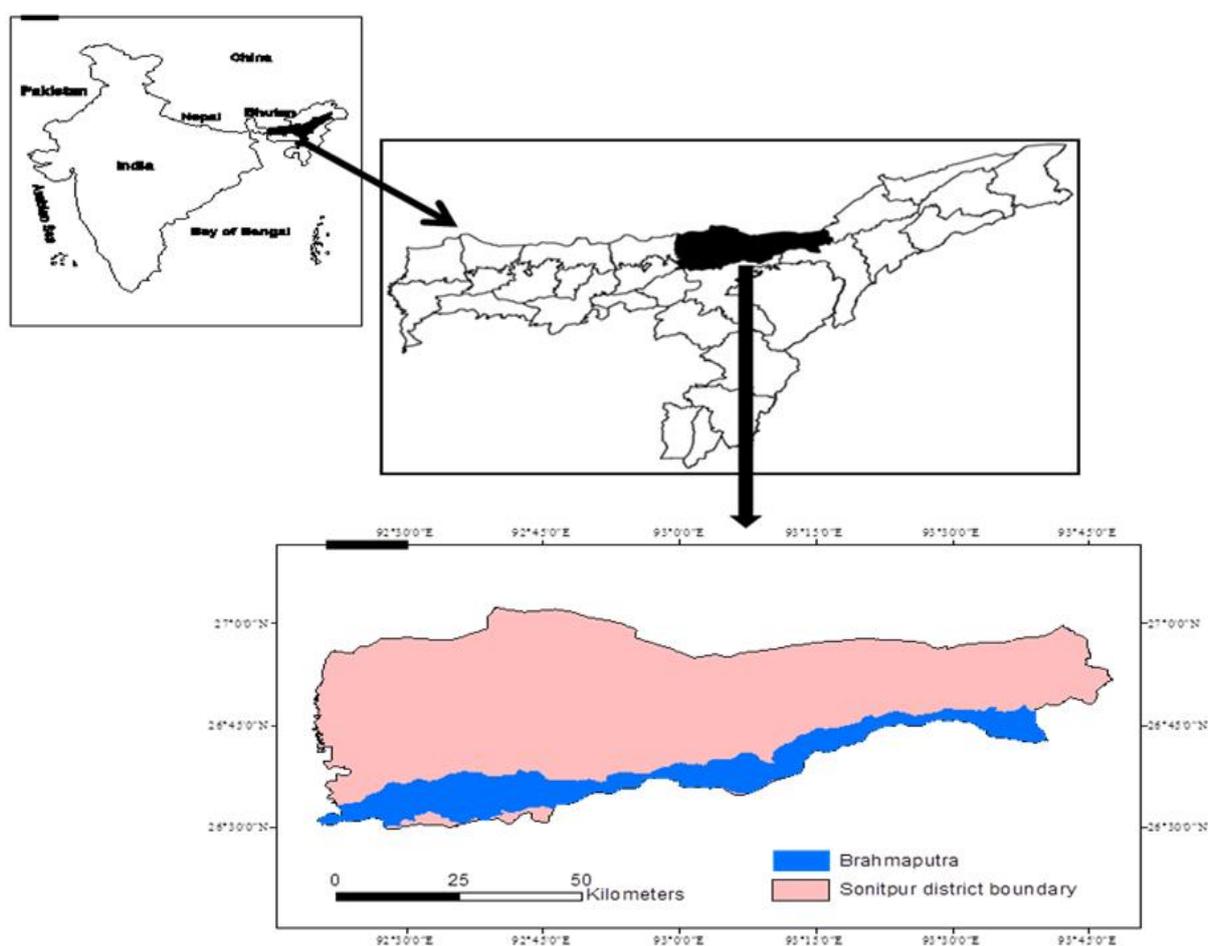


Figure 1. Map of study area, Sonitpur district of Assam, India.

Sonitpur is the second largest district of state Assam after Karbi Anglong district, spread over an area of 5324 km² on the north bank of Brahmaputra river with a population about 1.926 million (Census 2011). The Sonitpur district lies between 26° 40' 25.9860" N and 92° 51' 27.7560" E and is bounded by Arunachal Pradesh in north, River Brahmaputra in south; Lakhimpur in east and Darrang in the west (Fig. 1). There are five major Rivers of Sonitpur namely, Brahmaputra, Jiabharali, Gabharu, Borgang and Buroi. The total forest area of

Sonitpur is 1420 km². The major forest area of district Sonitpur comprises Nameri National Park (NP); Burhachapori and Sonai Rupai Wildlife Sanctuaries (WLS) and 11 Reserve Forests (RF) distributed in two broad divisions Sonitpur East and West. As per census 2011 data the tribal population of Sonitpur is about 2,32,000 which comprises of different tribal groups, among them Mishing, Bodo, Rabhas, Mechs, Nyishis, Garos, Adis, Munda, Apatanis, Lamas etc. are some important tribal communities.

Methodology

An extensive field survey was carried out in order to document ethnobotanical plant species associated with Mishing community in seventeen (17) different villages during 2013 – 2015. A series of informal meeting was conducted with the village heads of each Mishing village and villagers with the age group of 15–85. A standard semi-structured questioner was used for the proposed survey which was prepared following the guideline of Convention on Biological Diversity (CBD). Vernacular names (*Mishing*) of plants were recorded while for medicinal plants part used, mode of administration, dose recommended for human care, nature and name of diseases were properly recorded through personal interaction with medicine men. For the record of NTFPs available in markets several small local markets (Bhalukpong, Khonamukh, Chariduar, near Gohpur, etc.) were also visited at frequent interval. Whole plants and different plant parts sold in the local markets were recorded and prices of each item were quantified. Herbarium were prepared following Jain & Rao (1977) for the recorded plant species and were identified checking the specimens at the herbarium of Gauhati University, Assam, Botanical Survey of India, Shillong and consulting relevant literature such as ‘Flora of British India’ (Hooker 1875–1894), ‘Flora of Assam’ (Kanjilal *et al.* 1934–1940), etc. and also consulted with some highly experienced taxonomists like Dr. Gajen Chandra Sarma, Gauhati University, Assam, India. The analysed herbariums were submitted to the Tezpur University Herbarium (TUH) at Ecology and Biodiversity laboratory for preservation.

RESULTS

The results of the present study highlight the ethno-medicine and NTFPs used by Mishing community of Sonitpur districts. The survey was carried out in 17 villages *viz.* Dharikati, Khonamukh, Kathani, Rangajan, Rongajan miri, Baligaon, Sotaimiri, Toupamiri, Bamunipam, Bordikorai, Sikomgaon, Silenighat, Morikhuti, Bokagaon, Kekokoli, Tinighoria and Gudamghat. A total of 194 villagers (149 male and 45 female) were interviewed. 55 respondents in the interview process belonged to age group of 32 - 45 years; 70 individuals in the range of 46–55 years; 33 individuals of 56–65 years; 24 individuals in 66–75 years and only 12 individuals in between 76–85 years. During this study a total number of 74 ethnobotanically important dicot plant species under 64 genera and 45 families has been recorded. Among this, 48 species were medicinal plant belonging to 46 genera under 34 families that were exclusively used for the ethno-medicinal purposes by the Mishing community (Table 1). Trees contributed highest (42%) number having 20 species belonging to 18 genera and 15 families followed by shrubs (31%; 15 species under 15 genera and 11 families), herbs (17%; 8 species, 8 genera and 8 families) and climber (10%) with 5 species, 5 genera and 5 families. Among the families Acanthaceae shows highest species diversity (4 genera and 4 species) followed by Rutaceae (3 genera and 3 species), Verbenaceae and Moraceae (2 genera and 3 species each) and Combretaceae has 3 species under 1 genera. While Euphorbiaceae, Lythraceae, Meliaceae, Solanaceae, Lamiaceae, Rubiaceae holds 2 genera and 2 species each. The other families comprise 1 genera and single species (Fig. 2). The different plant parts used for the different treatment of human diseases are also recorded during the study. Among the plant part, leaves (50%) is extensively used as medicines followed by fruit (17%), whole plant, root and stem (6%), bark (7%), gum/resin (4%), flower and seed consists (2%), as given in figure 3. During the study a detailed note on the species used for different diseases were also estimated. As per record, 19% of species were utilised for stomach problems; 13% utilised for dysentery; 10% were used for skin problems; 8% for hair therapy, worm and cough; 4% were used in liver disorder, gynaecological, urinary problems, infections and as health tonic each; and 2% of recorded species were used for diabetes, dog-bite, pains, teeth problems, abortion and fractures (Fig. 4). During the interview it has also been observed that the majority of the medicine prepared by herbal medicine-men was administrated internally contributing 81% and some 19% medicine were administrated externally. Another part of this study was to trace out different NTFPs specially dicots from Sonitpur district used by Mishing tribe. After a multi phased field observation a total of 23 species belonging to 17 genera under 15 families were

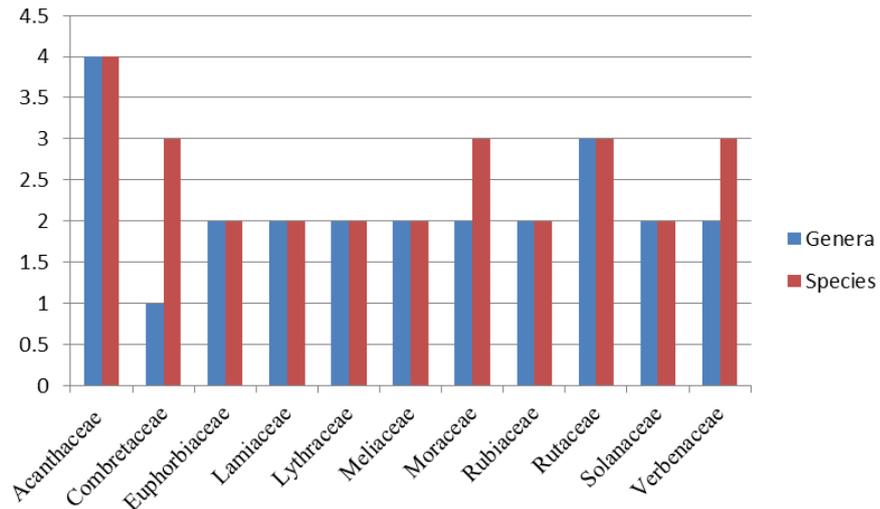


Figure 2. Analysis of dominant families (Dicots) for the recorded plant species.

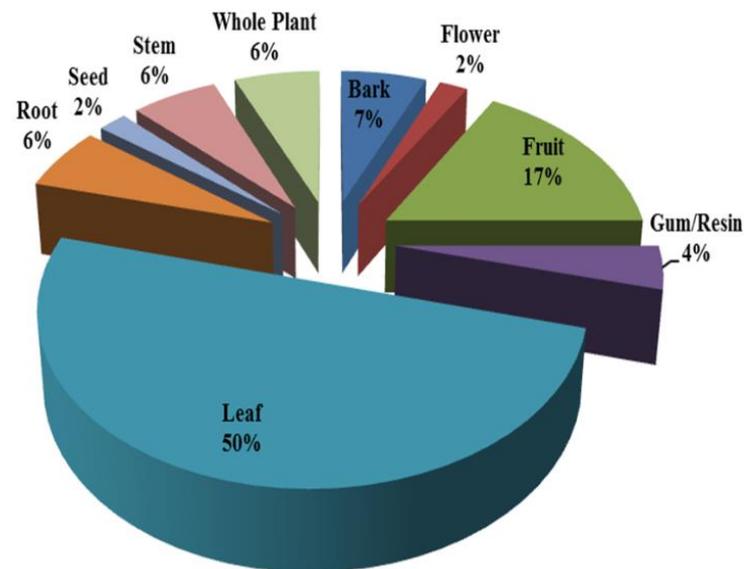


Figure 3. Percentage contribution of different plant parts used in preparation of medicine.

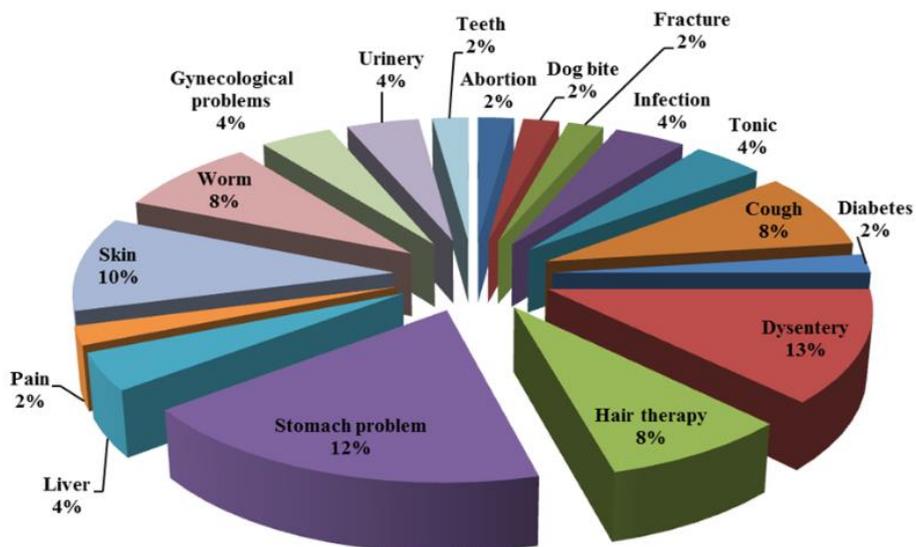


Figure 4. Contribution of medicinal plants used for treatments of certain human health ailments.

Table 1. Details of the recorded ethno-medicinal plant species used by Mishing tribe. (Note: T- Tree, CL- Climber, SH- Shrub, H- Herb)

Sl. No.	Botanical name of the plants	Family	Vern name (Mishing)	Uses	Life form	Part used	Dose/ administration (E/I)*
1.	<i>Acacia nilotica</i> (L.) Delile	Mimosaceae	Babul	Dry cough, kidney trouble	T	Leaf, bark	I: decoction of leaf and bark used after meal.
2.	<i>Adhatoda vasica</i> Nees	Acanthaceae	Bahek phul	Cough etc.	H	Leaf	I: decoction of leaf used after meal.
3.	<i>Aegle marmelos</i> (L.) Corréa	Rutaceae	Bel	Small pox	T	Leaf	E: pest of young leaf used in the small pox.
4.	<i>Ananas comosus</i> (L.) Merr.	Bromeliaceae	Matikothal	Vomiting /indigestion	SH	Leaf	I: 2/3 young leaf taken and grind then the juice is directly taken with a small salt.
5.	<i>Andrographis paniculata</i> (Burm. f.) Nees	Acanthaceae	Kalmegh	Liver tonic	SH	Leaf	I: young leaf smashed and the distilled juice is taken daily for liver problem.
6.	<i>Asparagus racemosus</i> Willd.	Asperagaceae	Satmul	Upset stomach (dyspepsia), constipation	CL	Root	I: root boiled with water or dried first and then powder boiled in water and taken for stomach problems.
7.	<i>Averrhoa carambola</i> L.	Oxalidaceae	Kordoi	Cough	T	Fruit	I: ripen fruit roasted in wood fire and eaten: juice eaten directly
8.	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Mohaneem	Skin infection /measles	T	Leaf	E: mature leaves boiled with water and the water used to bath.
9.	<i>Bacopa monnieri</i> (L.) Wettst.	Scrophulariaceae	Brahmi	Brain tonic	H	Whole plant	I: whole plant grind and the juice drink.
10.	<i>Bryophyllum pinnatum</i> (Lam.) Oken	Crassulaceae	Duportenga	Urinal infection	H	Leaf	I: young leaf consumed directly.
11.	<i>Butea monosperma</i> (Lamk.) Taub	Fabaceae	Palas	Diarrhoea	T	Gum/resin	I: used directly
12.	<i>Calotropis gigantea</i> (L.) Dryand.	Apocynaceae	Aah: Kam	Pain	SH	Leaf	E: mature leaves kept over fire and then with mastered oil and wrapped the pained area.
13.	<i>Capsicum annuum</i> L.	Solanaceae	Surging mirsi	Stomach problem/gastric	SH	Fruit	I: eaten directly
14.	<i>Centella asiatica</i> (L.) Urban.	Apiaceae	Manimuni	Vomiting /indigestion	H	Whole plant	I: leaf juice with water or chewed the whole plant.
15.	<i>Cissus quadrangularis</i> L.	vitaceae	Harjora	Bone fracture	CL	Whole plant	E: the plant used as bandage or plastering for bone fracture.
16.	<i>Citrus maxima</i> (Burm.) Merr.	Rutaceae	Singliang	Skin	T	Fruit	I: fruit eaten directly
17.	<i>Clerodendron colebrookianum</i> L.	Verbenaceae	Pakkom	Weight loss/fever	SH	Leaf	I: young leaf consumed as vegetable
18.	<i>Corchorus capsularis</i> L.	Tiliaceae	Mura	Stomach problem /vomiting	SH	Leaf	I: tender Leaf dried with smoke and then boiled and eaten

Sl. No.	Botanical name of the plants	Family	Vern name (Mishing)	Uses	Life form	Part used	Dose/ administration (E/I)*
19.	<i>Datura stramonium</i> L.	Solanaceae	Dhatura	Bite by mad dog	SH	Root	I: root decoction
20.	<i>Dillenia indica</i> L.	Dilleniaceae	Champa	Hair therapy	T	Fruit	E: the seeds are grind and the then seeds are used over hair for smooth and to reduce hair fall. I: leaf consumed directly.
21.	<i>Drymaria cordata</i> (L.) Willd. ex Schult.	Caryophyllaceae	Laijabori	Dermatitis	H	leaf	I: leaf consumed directly.
22.	<i>Eupatorium odoratum</i> L.	Asteraceae	Ayapan	High blood pressure	SH	Leaf/root	I: Decoction
23.	<i>Ficus hirta</i> Vahl	Moraceae	Taksek	Urine problem	T	Fruit	I: ripen fruit used directly or cooked for urine problem.
24.	<i>Hedyotis diffusa</i> Willd.	Rubiaceae	Sarpajiva	Stomach pain/ nerve tonic	H	Leaf	I: juice or cooked vegetable
25.	<i>Jatropha curcas</i> L.	Euphorbiaceae	Votera	Abortion	T	Resin	I: resin with milk consumed for 2/3 days
26.	<i>Justicia adhatoda</i> L.	Acanthaceae	Bahaka	Cough	SH	Leaf	I: leaf juice used for dry cough
27.	<i>Lawsonia inermis</i> L.	Lythraceae	Jetuka	Skin and hair diseases	SH	Leaf	E: leaf paste used in hair and skin
28.	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Dorun	Sinus	H	Leaf	I: 2/3 drop of leaf juice used per nose.
29.	<i>Mangifera indica</i> L.	Anacardiaceae	Ke: di milong	Dysentery	T	Bark /seed	I: decoction of bark taken in empty stomach; twice daily before meal till complete relief. The seeds are eaten raw or roasted.
30.	<i>Melia azadirachta</i> L.	Meliaceae	Ghoraneem	Skin infection	T	Leaf	E: Leaf boiled and water used to bath.
31.	<i>Moringa oleifera</i> Lam.	Moringaceae	Munga	Stomach problem	T	Fruit/flower/leaf	I: cooked a vegetable
32.	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Norhing	Dysentery	T	Leaf	I: cooked a vegetable
33.	<i>Nyctenthis arbor-tristis</i> L.	Oleaceae	Sewali	Worm	T	Flower	I: flower fry eaten
34.	<i>Ocimum basilicum</i> L.	Lamiaceae	Tulsi	Cough	SH	Leaf	I: leaf juice with honey taken for cough.
35.	<i>Paederia foetida</i> L.	Rubiaceae	Vedeli	Indigestion	CL	Leaf	I: leaf juice used directly or cooked with fish.
36.	<i>Phlogacanthus thyriflorus</i> Nees	Acanthaceae	Titaphul	Bronchitis	SH	Bark & Leaf	I: decoction of bark & leaf taken till complete relief.
37.	<i>Phyllanthus acidus</i> Skeel	Euphorbiaceae	Pora amlokhi	White discharge of women	T	Leaf	I: leaf juice with sugar. Daily in empty stomach for 15 days to 3 months.

Table 1. Details of the recorded ethno-medicinal plant species used by Mishing tribe. (**Note:** T- Tree, CL- Climber, SH- Shrub, H- Herb)

Sl. No.	Botanical name of the plants	Family	Vern name (Mishing)	Uses	Life form	Part used	Dose/ administration (E/I)*
38.	<i>Piper betel</i> Blanco.	Piperaceae	Paan	Boil/cut injury	CL	stem	E: stem is taken and dipped in the hot mustard oil and then touched the boil or cut injury for relief of pain and quick recovery
39.	<i>Psidium guajava</i> L.	Myrtaceae	Madhuri	Stomach pain	T	Leaf	I: 2/3 young leaf grind and ½ spoon juice taken.
40.	<i>Punica granatum</i> L.	Lythraceae	Anar	Diarrhoea/ anaemia	SH	Leaf/flower/fruit	I: fruit eaten directly; flower and leaf cooked; leaf juice used
41.	<i>Scoparia dulcis</i> L.	Plantaginaceae	Tisilkosa	Diabetes	SH	Leaf	I: eaten directly.
42.	<i>Sesamum orientale</i> L.	Padaliaceae	Tanam	Hair fall	SH	Seed	I: seed cooked or grind and used in hair.
43.	<i>Streblus asper</i> Lour.	Moraceae	Namhoi	Teeth problem	T	Stem	E: stem used as tooth brass.
44.	<i>Swertia chirata</i> Buds-Ham.	Gentianaceae	Sirata	Worm /allergy /vegetable /	H	Stem/ Leaf	2/3 stem soaked for some hours or overnight and the soaked water is taken (2 spoon) for two days
45.	<i>Terminalia chebula</i> Retz.	Combretaceae	Silika	Hair growth /constipation /heart problem	T	Fruit	I: Fruit dried and grind and the powder used directly; or wholly eaten
46.	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun	Heart/liver tonic	T	Bark /root	I: decoction of root and bark used; powder of bark mixed with hot water for heart diseases.
47.	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Bhomora	Hair growth /constipation	T	Fruit	I: fruit dried and the inner part grind and the powder used directly
48.	<i>Tylophora indica</i> (Burm f.) Merr.	Asclepiadaceae	Anantamul	Liver Tonic/ Jaundice	CL	Root	I: root eaten directly

Table 2. List of NTFPs (Dicots) marketed by Mishing tribe of Sonitpur, Assam. (**Note:** T- Tree, CL- Climber, SH- Shrub, H- Herb)

Sl. No.	Botanical name of the plants	Family	Vernacular name (Mishing)	Part collected	Uses	Life forms	Local market price (INR)	Source of collection	Availability
Fruits									
1.	<i>Baccaurea sapida</i> (Roxb.) Muell.-Arg.	Euphorbiaceae	Buri aaye	Fruit	Fruit	SH	15-20 /dozen	Forest	March–July
2.	<i>Citrus grandis</i> (L.) Osbeck	Rutaceae	Sinkin	Fruit	Fruit	T	5/fruit	Forest	All seasons
3.	<i>Garcinia paniculata</i> Roxb.	Clusiaceae	Tepor tenga	Fruit	Fruit	T	10/fruit	Forest	July–October
4.	<i>Phyllanthus acidus</i> (L.) Skeels	Phyllanthaceae	Pomlokhi /Pora - aamlokhi	Fruit	Fruit	T	15-20/kg	Forest	March–May

Sl. No.	Botanical name of the plants	Family	Vernacular name (Mishing)	Part collected	Uses	Life forms	Local market price (INR)	Source of collection	Availability
Medicine									
5.	<i>Adhatoda vasica</i> Nees	Acanthaceae	Bahek phul	Leaf	Medicine – cough etc.	H	10/ bundle	Forest	All seasons
Resins									
6.	<i>Boswellia serrata</i> Roxb.	Burseraceae	Dhuna	Resin	Resin	T	70-100/kg	Forest	All seasons
Spices									
7.	<i>Piper nigrum</i> L.	Piperaceae	Jaluk	Seed	Spice	CL	120-150/ 100 gm	Forest	All seasons
8.	<i>Piper longum</i> L.	Piperaceae	Pipali	Seed	Spice	CL	120-150/ 100 gm	Forest	All seasons
Vegetables									
9.	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Geyag	Leaf with stem	Vegetable	SH	20/bundle	Forest	All seasons
10.	<i>Amaranthus viridis</i> L.	Amaranthaceae	Datha	Leaf with stem	Vegetable	SH	10/bundle	Forest	All seasons
11.	<i>Dillenia indica</i> L.	Dilleniaceae	Champa	Fruit	vegetable	T	5-7/pair	Forest	June–October
12.	<i>Dioscorea alata</i> L.	Dioscoreaceae	Nimti	Tuberous root	vegetable	CL	20-25 /kg	Forest	All seasons
13.	<i>Solanum nigrum</i> L.	Solanaceae	Bangko	Fruit	vegetable	SH	10/ poa (250 gm)	Forest	All seasons
14.	<i>Murraya koenigii</i> (L) Spreng	Rutaceae	Narasingha	Tender leaf	vegetable	SH	5/bunch	Forest	All seasons
15.	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	Amaranthaceae	Morisha	Leaf	vegetable	H	10-15/bundle	Forest	All seasons
16.	<i>Solanum indicum</i> L.	Solanaceae	Banko	Leaf	Vegetable	SH	20/ bunch	Forest	All season
17.	<i>Solanum torvum</i> Sw.	Solanaceae	Sitabanko	Fruit	Vegetable	SH	30/ 250 gm	Forest	All season
18.	<i>Garcinia cowa</i> L.	Clusiaceae	Kuji Thekera	Fruit	Vegetable	T	20/fruit	Forest	Almost all season
19.	<i>Ficus glomerata</i> Roxb.	Moraceae	Tejing /taksek	Leaf	Vegetable specially with Pork	T	20/packet	Forest	All season
20.	<i>Dioscorea alata</i> L.	Dioscoreaceae	Alé	Tuber	Vegetable	CL	50/kg	Forest	All season

Sl. No.	Botanical name of the plants	Family	Vernacular name (Mishing)	Part collected	Uses	Life forms	Local market price (INR)	Source of collection	Availability
Vegetable And Medicine									
21.	<i>Paederia foetida</i> L.	Rubiaceae	Bunka fore	Young Leaf	Vegetable and medicine for stomach problem.	CL	10/bundle	Forest	All seasons
22.	<i>Centella asiatica</i> (L.) Urban	Apiceae	Manimuni	Whole plant	medicine and vegetable	H	5/bundle	Forest	All seasons
23.	<i>Leucas aspera</i> (Willd) Link	Lamiaceae	Durum	Young leaf	vegetable and medicine for nose problem	H	5/bunch	Forest	All seasons

Table 3. List of plant species (dicots) used for the preparation of *Epop*, used for preparation of *Nogjin Apong*. (Note: T- Tree, CL- Climber, SH- Shrub, H- Herb)

Sl. No.	Botanical name of the plants	Family	Vern name (Mishing)	Life form	Part used	Use /mode
1.	<i>Clerodendrum infortunatum</i> L.	Verbenaceae	Pakkom	SH	Leaf	I: Leaf dried and powder used in the preparation of <i>Epop</i>
2.	<i>Coriandrum sativum</i> L.	Apiaceae	Dhania	H	Stem/leaf	I: stem/ Leaf dried and powder used in the preparation of <i>Epop</i>
3.	<i>Costus speciosus</i> (J.Koenig) Sm.	Costaceae	Jomlakhuti	SH	Leaf	
4.	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	Rabonlota	CL	Root	I: root dried and powder used in the preparation of <i>Epop</i>
5.	<i>Flemingia strobilifera</i> (L.) W.T.Aiton	Fabaceae	Makhioti	SH	Leaf	
6.	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Leunaapum	T	Leaf	I: Leaf dried and powder used in the preparation of <i>Epop</i>
7.	<i>Lippia javanica</i> (Burm.f.) Spreng.	Verbenaceae	----	H	Leaf/flower	I: Leaf/flower dried and powder used in the preparation of <i>Epop</i>
8.	<i>Polygonum hydropiper</i> L.	Polygonaceae	Leubo	H	Leaf/stem	I: Leaf/stem dried and powder used in the preparation of <i>Epop</i>
9.	<i>Polygonum microcephalum</i> D. Don	Polygonaceae	Nekungkune	H	Leaf	----
10.	<i>Tinospora cordifolia</i> (Willd.) Miers	Menispermaceae	Amrita	CL	Leaf	I: Leaf dried and powder used in the preparation of <i>Epop</i>
11.	<i>Zanthoxylum nitidum</i> (Roxb.) DC.	Rutaceae	Jabrang	SH	Leaf	

recorded as NTFPs that has been marketed extensively by this community in different regions of the district (Table 2). It has been observed that species used for vegetables contributes maximum (52%) followed by fruits (18%); species used for both vegetable and medicine (13%); spices (9%); and resins and medicine 4% each (Fig. 5). Different plant parts were collected by the villagers for marketing and to be used for vegetables, fruits, resins, medicine, etc. The majority of the plant parts are available throughout the year and some are found to be seasonal. One more interesting fact about the marketing of the NTFPs is that they generally do not use the weighing scale for measuring quantity of items instead they sold the items in some bundles/bunch or in pairs.

Another most important traditional practice of Mishing community is the preparation of *Nogin or Nogjin Apong*, a traditional rice alcoholic beverage of Mishing Community. For the preparations of the *Nogin Apong* they use many plants species (both dicots and monocots). During the preparations of the *Apong* first they prepare *Epop*. *Epop* is the tablet or ball shaped cake prepared with the dry powder of plant materials mixing with the rice powder and is used for the preparation of *Nogin or Nogjin Apong*. During the study a total of 11 dicot plant species (*Clerodendrum infortunatum*, *Coriandrum sativum*, *Costus speciosus*, *Cuscuta reflexa*, *Flemingia strobilifera*, *Hibiscus rosa-sinensis*, *Lippia javanica*, *Polygonum hydropiper*, *P. microcephalum*, *Tinospora cordifolia* and *Zanthoxylum nitidum*) under 10 genera and 9 families (Table 3) were recorded that were exclusively used for the preparation of *Epop*.

DISCUSSIONS

The main objective of the present study was to investigate the different plant species (especially dicots) that are exclusively used by the *Mishing* community in their day-to-day life for different purposes like medicine, vegetable and importantly other NTFPs *i.e.* vegetables, fruits, medicine, spices, gum/resin etc. as their one of the important income sources. From the result it has been observed that the majority of the plant species were used mainly for medicinal purpose. Leaves exhibited major part of the plant used for treatment of majority of diseases contributing 50% while flower shows lowest used (2%). Saikia *et al.* (2010) studied ethnobotany of Bodo tribes in Sonitpur district and enumerated 20 species and analysed briefly the degree of dependency on medicinal plants and common health concern. Another ethnobotanical study reported a total number of 20 plant species out of which 12 dicot species from Gahpur area of Sonitpur district (Saikia 2006). In the present study a total of 48 plant species were recorded for medicinal uses, 23 species were recorded as NTFPs and 11 species recorded that are used for the preparation of *Apong*. Majority of the plants like *Ananas comosus*, *Centella asiatica*, *Psidium guajava*, *Hedyotis diffusa*, *Moringa oleifera*, *Corchorus capsularis*, *Capsicum annum*, *Streblus asper* and *Asparagus racemosus* are used for stomach problems while *Butea monosperma*, *Punica granatum*, *Acacia nilotica*, *Mangifera indica*, *Murraya koenigii*, etc are used for dysentery. *Averrhoa carambola*, *Justicia adhatoda*, *Ocimum basilicum* and *Adhatoda vasica* are commonly used for cold and cough by the community. Fruits of *Baccaurea sapida*, *Citrus grandis*, *Garcinia paniculata*, *Phyllanthus acidus*, etc are marketed as NTFPs while resins of *Boswellia serrate* and fruit/seeds of *Piper nigrum* and *P. longum* are marked as spices.

CONCLUSION

From the present study it can be concluded that the Mishing tribe is highly dependent upon the dicot angiosperms as their source of income in addition to fulfilling their various day to day requirements. Thus NTFPs plays a major role in the livelihood status of Mishing tribe by supplying domestic requirement and marketing goods. Understanding the present days environmental health issues related to chemicals in the form of pesticides, weedicide, etc. peoples generally prefer to buy the NTFPs sold in the local markets by tribal peoples which are collected from the forest. This marginal marketing also serves as a source of income to this community.

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